

Course Competencies Template - Form 112

GENERAL INFORMATION			
Name:	Phone #:		
Course Prefix/Number: EET1037C	Course Title: Electronics Computer Simulations		
Number of Credits: 3			
Degree Type	<input type="checkbox"/> B.A. <input type="checkbox"/> B.S. <input type="checkbox"/> B.A.S <input type="checkbox"/> A.A. <input checked="" type="checkbox"/> A.S. <input type="checkbox"/> A.A.S. <input type="checkbox"/> C.C.C. <input type="checkbox"/> A.T.C. <input type="checkbox"/> V.C.C		
Date Submitted/Revised: 09-14-2009	Effective Year/Term: 2013-1		
<input type="checkbox"/> New Course Competency <input checked="" type="checkbox"/> Revised Course Competency			
Course to be designated as a General Education course (part of the 36 hours of A.A. Gen. Ed. coursework): <input type="checkbox"/> Yes <input type="checkbox"/> No			
The above course links to the following Learning Outcomes: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Communication <input checked="" type="checkbox"/> Numbers / Data <input checked="" type="checkbox"/> Critical thinking <input type="checkbox"/> Information Literacy <input type="checkbox"/> Cultural / Global Perspective </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Social Responsibility <input type="checkbox"/> Ethical Issues <input checked="" type="checkbox"/> Computer / Technology Usage <input type="checkbox"/> Aesthetic / Creative Activities <input type="checkbox"/> Environmental Responsibility </td> </tr> </table>		<input type="checkbox"/> Communication <input checked="" type="checkbox"/> Numbers / Data <input checked="" type="checkbox"/> Critical thinking <input type="checkbox"/> Information Literacy <input type="checkbox"/> Cultural / Global Perspective	<input type="checkbox"/> Social Responsibility <input type="checkbox"/> Ethical Issues <input checked="" type="checkbox"/> Computer / Technology Usage <input type="checkbox"/> Aesthetic / Creative Activities <input type="checkbox"/> Environmental Responsibility
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Course Description (limit to 50 words or less, <u>must</u> correspond with course description on Form 102): An investigation of network theorems with practical illustrations. Thevenin's, Norton's, Kirchoff's and the superposition methods of analysis are applied to the solution of resistive and reactive networks. Resonant circuits and transient voltages and currents are analyzed. Prerequisite: EET 1141C. Pre/corequisite: MTB 1322 (3 hr. lecture)			
Prerequisite(s): EET1141C	Pre/co-requisite(s): MTB1322		

Course Competencies: (for further instruction/guidelines go to: <http://www.mdc.edu/asa/curriculum.asp>)

Competency 1: The student will demonstrate the ability to use microcomputer circuit simulation programs by:

1. Performing basic computer tasks including saving, copying, and naming, files; creating directories; make a temporary directory on the desktop, renaming a file or directory; making a template page, etc.
2. Identifying the screen elements and functions of the simulation software.
3. Navigating the simulation software screen.
4. Placing text on the screen, labeling a component, changing a component value, changing the color of objects (the background, a wire, a component), showing the grid, page bounds, border; zooming in and out; printing reports, instruments, and bills of materials; and writing a circuit description.
5. Selecting components to build circuits.
6. Generating parts lists.
7. Generating reports.
8. Connecting to the internet and downloading documentation.

Revision Date: 08-26-2014

Approved By Academic Dean Date: _____

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Competency 2: The student will demonstrate an understanding of basic electronic circuit theory by:

1. Describing the characteristics of a variety of circuit types including: series, parallel, series-parallel, diode, zener diode, and voltage divider biased common emitter circuits.
2. Describing how various filters functions, including low-pass, high pass, band pass.
3. Explaining how rectifiers work.

Competency 3: The student will demonstrate the ability to use the simulation software by:

1. Designing, constructing, and analyzing diode circuits.
2. Designing, constructing, and analyzing regulator circuits using zener diodes.
3. Design, construct, and analyze series and parallel circuits.
4. Design, construct, and analyze a series RC circuit using a signal generator, DVM (digital volt meter), and an oscilloscope.
5. Drawing and obtaining measurements of DC (direct current) series-parallel circuits.
6. Drawing a zener diode voltage regulator and determining the proper circuit voltages and currents.
7. Designing an original circuit incorporating a variety of circuit components e.g., LED's, switches, light bulbs, buzzers, sonalerts, etc. and verifying the circuit operation.
8. Drawing and analyzing a high pass attenuator.

Competency 4: The student will demonstrate the ability to use the simulation software to analyze circuits by:

1. Using the Bode plotter to interpret the waveform of low-pass filters.
2. Using polar to rectangular conversion to analyze RC alternating current circuits.
3. Interpreting the effect of changing values on the circuit.
4. Obtaining both the forward and reverse bias voltages.
5. Analyzing a zener diode.
6. Analyzing a zener diode voltage regulator circuit.
7. Explaining the Bode plotter and its use in electronic circuits analysis
8. Using frequency response and mathematical analysis.
9. Applying Millman's Theorem to analyze complex circuits and verify their operations.
10. Analyzing step up, step down, and center tap transformers to determine their primary voltage, secondary voltage, and turns ratio.
11. Analyzing the properties of a full wave rectifier.
12. Describing the functionality of Lissajous patterns, and how they are used to calibrate the frequency of waveform.
13. Designing a Lissajous circuit that will produce a specific pattern.

Competency 5: The student will demonstrate the ability to use the simulation software to identify circuit problems by:

1. Troubleshooting circuit malfunctions.
2. Troubleshooting simple diode circuits, a voltage regulated power supply, and a zener diode.
3. Observing the input and output waveforms of a full wave rectifier, and be able to troubleshoot the circuit on the computer.
4. Observing the proper values of voltages and currents in the voltage divider bias circuit and troubleshoot the circuit to determine the defective part.
5. Determining the defective component in a full wave rectifier.
6. Determining the defective component in a bridge rectifier.

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7. Observing the properties of a half wave rectifier, interpreting the signals, and troubleshooting the circuit.

Competency 6: The student will demonstrate an understanding of filters by:

1. Defining a filter, describing how it operates, and explaining its uses.
2. Stating the differences between a low-pass and a high-pass filter.
3. Describing how the bode plot is used to analyze filters.
4. Drawing and analyzing a low pass filter and printing out the bode plotter waveform.
5. Drawing and analyzing a high pass filter using bode plot, frequency response and mathematical analysis.
6. Drawing and analyzing a band stop filter and interpreting the bode plot data.
7. Describing the performance characteristics of a high pass attenuator.
8. Obtaining the proper decibel values using complex algebra.

Competency 7: The student will demonstrate the ability to work with clipper circuits by:

1. Defining and describing the properties of clipper circuits.
2. Describing the operation of and differences between series and shunt clippers, positive and negative peak series diode clippers, and positive and negative shunt diode clippers.
3. Drawing the waveform for various types of clipper circuits.
4. Troubleshooting defective components in a clipper circuit.

Competency 8 The student will demonstrate an understanding of waveforms by:

1. Explaining the functions of positive and negative peak clampers.
2. Using a square wave input to describe the reference level of clamper waveforms.
3. Drawing clamper waveforms observed on the computer.

Competency 9: The student will use the simulation software to demonstrate an understanding of basic linear integrated circuit (IC) functionality by:

1. Describing IC characteristics including Beta, characteristic curves, junction voltages, ac input resistance, etc.
2. Observing typical IC properties using computer software.
3. Drawing a base bias amplifier on the computer screen.
4. Measuring all DC voltages and currents and observing the input and output AC waveforms on the computer.
5. Performing an AC analysis of the amplifier and printing out the circuit, waveforms and analysis results.
6. Observing the proper values of voltages and currents in the voltage divider bias circuit and troubleshooting the circuit to determine the defective part.
7. Configuring a voltage divider biased common emitter circuit.
8. Performing a load line analysis to determine the optimum operating point location.

Competency 10: The student will demonstrate an understanding of logic circuits by:

1. Defining a logic circuit and its uses.
2. Describing how logic circuits differ from other types of circuits.
3. Constructing and analyzing logic circuits including both and or gates.
4. Identifying the Karnaugh map and the diode components which are equivalent to each gate.

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